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PATENT APPLICATION

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In re Application of: )  
SUE-KEN YAP ET AL. ) Examiner: N.Y.A.  
Application No.: 09/835,325 ) Group Art Unit: N.Y.A.  
Filed: April 17, 2001 )  
For: A METHOD AND SYSTEM )  
FOR USING MULTIPLE )  
SMARTCARDS IN A READER ) May 15, 2001

Commissioner for Patents  
Washington, D.C. 20231

CLAIM TO PRIORITY

Sir:

Applicants hereby claim priority under the  
International Convention and all rights to which they are  
entitled under 35 U.S.C. § 119 based upon the following  
Australian Priority Applications:

PQ 7056, filed April 20, 2000; and

PR 0074, filed September 12, 2000.

Certified copies of the priority documents are  
enclosed.

Applicants' undersigned attorney may be reached in  
our New York office by telephone at (212) 218-2100. All

correspondence should continue to be directed to our address  
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Respectfully submitted,

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09/835,325



**Patent Office  
Canberra**

I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 7056 for a patent by CANON KABUSHIKI KAISHA filed on 20 April 2000.



WITNESS my hand this  
Twenty-fourth day of April 2001

*J R Yabsley*

JONNE YABSLEY  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES

**ORIGINAL**

**AUSTRALIA**

**Patents Act 1990**

**PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:**

A Method for Using Low-Cost Smartcards as a User Interface

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This invention is best described in the following statement:

## **A METHOD FOR USING LOW-COST SMARTCARDS AS A USER INTERFACE**

### **Technical Field of the Invention**

5           The present invention relates generally to user interfaces and, in particular, to portable, programmable (soft) interfaces. The present invention relates to a method and system for providing a plurality of programmable user interfaces. The invention also relates to a computer program product including a computer readable medium having recorded thereon a computer program for providing a plurality of programmable user  
10 interfaces.

### **Background Art**

Smartcards are increasingly being used as portable, programmable user interfaces, particularly when used in conjunction with smartcard readers which provide  
15 access to user-selectable icons printed on a surface of the smartcard, wherein association between a selected icon and a corresponding action is stored in an on-card memory.

Memory real estate on smartcards is, however, expensive, and this mitigates against use of smartcards for cost-sensitive user interface applications, particularly since this type of user interface is typically a "throwaway" type of device.

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### **Disclosure of the Invention**

It is an object of the present invention to substantially overcome, or at least ameliorate, one or more disadvantages of existing arrangements.

According to a first aspect of the invention, there is provided a method of  
25 providing programmable user interfaces, in a system comprising a plurality of

programmable smartcards, aggregated into a lesser plurality of groups of said smartcards, said method comprising the steps of:

(a) inserting a first smartcard into a smartcard reader;

(b) reading and storing, by the smartcard reader, if said first smartcard is a base smartcard, (i) an identity for a group, (ii) an identity of the base smartcard, (iii) an interface description for the base smartcard, (iv) an identity for at least one associated member card, and (v) an interface description for said at least one associated member card;

(c) ejecting the first smartcard from the smartcard reader and inserting a second smartcard therein, said smartcard reader making accessible a user selectable icon, having an associated action, on a surface of the inserted second smartcard;

(d) reading by the smartcard reader, if said second inserted smartcard is a member card associated with said base smartcard, of (i) said identity of said group, to which said second inserted smartcard is associated, and (ii) an identity of the inserted associated member smartcard;

(e) comparing the group identity read from the first smartcard to the group identity read from the second smartcard; and

(f) enabling, because said compared group identities match, the associated action if a user selects the user selectable icon, whereby the association between the icon and the action is defined by the interface description for the associated member smartcard read and stored from the associated base smartcard.

According to a second aspect of the invention, there is provided a method for enabling smartcard initiated actions associated with a group of smartcards comprising a base smartcard and at least one associated member smartcard, said method comprising steps of:

inserting the base smartcard into a smartcard reader;

reading by said smartcard reader of base smartcard data and first data for the associated member smartcard;

inserting the member smartcard into the smartcard reader;

5 reading by said smartcard reader of second data from the inserted member smartcard; and

enabling a smartcard initiated action associated with the member smartcard dependent upon a correspondence between the first data and the second data.

According to another aspect of the invention there is provided an apparatus  
10 adapted to perform the aforementioned method.

According to yet another aspect of the invention there is provided a computer program product including a computer readable medium having recorded thereon a computer program for implementing the method described above.

## 15 **Brief Description of the Drawings**

A number of preferred embodiments of the present invention will now be described with reference to the drawings, in which:

Fig. 1 is a block diagram representation of a preferred embodiment of the present invention; and

20 Fig. 2 is a schematic block diagram of a general purpose computer upon which the preferred embodiment of the present invention can be practiced.

## **Detailed Description including Best Mode**

Where reference is made in any one or more of the accompanying drawings to  
25 steps and/or features, which have the same reference numerals, those steps and/or features

have for the purposes of this description the same function(s) or operation(s), unless the contrary intention appears.

In the context of this specification, the word “comprising” means “including principally but not necessarily solely” or “having” or “including” and not “consisting only of”. Variations of the word comprising, such as “comprise” and “comprises” have  
5 corresponding meanings. The terms “smartcards” and “cards” are used interchangeably.

Fig. 1 shows a block diagram representation of a preferred embodiment of the present invention. A smartcard reader 114 is connected by a data connection 126 to a processing device 128. The smartcard reader 114 has an access aperture 118 through  
10 which a smartcard, eg. 100, can be inserted as depicted by an arrow 122. When the card 100 is so inserted, icons 108, 106 are made visible to a user through a control aperture 116, this accessibility being depicted by icon “ghosts” 142, and 144 respectively. The card 100 can be withdrawn from the smartcard reader 114, and another card 102 inserted as before, in which case an icon 112 on this card 102 is made accessible to the user  
15 through the control aperture 116, as depicted by a ghost icon 146. A memory device 132 is connected to the processing device 128 by a data connection 138, and the processing device 128 is provided with a display 130. Each icon 108 is associated with an “action” which is enabled when the card 100 is inserted into the smartcard reader 114, and when a user subsequently “selects” the icon 108, this selection being detected by the smartcard  
20 reader 114. The icon/action association is stored in a memory device 110 on the card 100, and the smartcard reader 114 is able to access the contents of the memory device 110 by means of suitable contacts (not shown) in the reader 114 which engage the memory device 110 upon inserting the card 100. The cost of manufacturing smartcards is directly proportional to the size of the memory device 110, and this memory device 110 is  
25 required to store icon/action associations for all icons 108 on the smartcard 100.



In the present embodiment, instead of each smartcard being an isolated entity, storing icon/action associations in an on-board memory, a group of smartcards 100, 102, ..., 104 are configured to provide portable, programmable user interface capability. This group approach advantageously reduces memory requirements for "member" cards 102, ..., 104, at the price of increasing memory capacity of a memory device 110 in the single "base" card 100. Accordingly, the base card 100 contains in the base card memory device 110, all the icon/action associations for the associated member cards 102, ..., 104. The member cards 102, 104 need only store identity information, thereby significantly reducing the requirements for memory capacity in the member card memory device 114. In aggregate, a relative manufacturing cost of smartcards in such a group is reduced in relation to the isolated smartcard approach.

In the present embodiment, the base card 100 contains, in the on-board memory device 110, icon/action association information for all associated member cards 102, ..., 104. The base card also stores a group identifier number (GIN) which is specific to the particular group of which it is a base card. The base card also stores a member identifier number (MIN) unique to itself. The associated member cards 102, ..., 104 need only store the same GIN as the base card 100, each member card also needing to store a MIN to identify itself. Once the base card 100 is inserted into the smart card reader 114, the icon/action association data, GIN and MIN relating to itself are stored in the system memory 132 as depicted by the reference numeral 134. Icon/action association data, GIN and MIN relating to associated member cards 102, ..., 104 are stored in the system memory 132 as depicted by the reference numeral 136. The base card 100 can, thereafter, be used as a user interface in its own right, through use of an icon 108, for example. Alternatively, and in addition, the base card 100 can be withdrawn from the reader 114, and any one of the associated member cards 102, ..., 104 inserted into the reader 114.

Although these member cards 102, 104 contain only their associated GIN/MIN identifiers, they can nonetheless act as user interfaces, and, for example, a user can select the icon 112 thereby affecting the corresponding action defined by the relevant icon/action association which was entered by means of the base card 100.

5           Accordingly, the present method relies on the concept of a group of cards comprising the base card 100, and associated member cards 102, ..., 104. This group can, typically, be related to a particular application. For example, such an application might be an electronic program guide, where the cards comprise a set of guides for twelve weeks of TV programs. All members of this group of cards share a common group  
10   identification number (GIN), which is stored in on-board memory in each card. One of the members of the group is designated as the base card, in the present case the card 100. The base card 100 has a member identification number (MIN) of zero. This base card 100 has a relatively large amount of memory, typically of the order of 4K bytes. The associated member cards 102, ..., 104 have card-specific MINs that are not zero. The  
15   base card 100 contains interface descriptions for all member cards 102, ..., 104 of the group, as well as an interface description for the base card itself. The member card interface descriptions are indexed by the corresponding MINs.

          Assuming that the smartcard reader 114 commences with no information stored in the associated memory 132, when the base card 100 is inserted into the reader 114, the  
20   reader recognises that this is the base card 100 of a group, by means of the associated MIN of zero. The reader 114 then reads the icon/action descriptions (ie the interface descriptions) for all the member cards in the group into memory 132 this depicted by a reference numeral 136. The reader 114 also stores the GIN of the base card in the memory 132.

When the base card 100 is ejected from the reader 114 and another card inserted in its place, one of three possible situations can occur. If another base card has been inserted, this will be indicated by a different GIN and an MIN of zero. In this event, the reader 114 and associated processor 128 recognise that a new base card has been inserted, and the historic data associated with the previous base card 100 is deleted, the system now focusing on the new base card and storing information as was described for the previous base card 100.

If, instead of a new base card, a member card from the same group (eg. the member card 102) is inserted, the member card will have the same GIN, but a non-zero MIN. The MIN of the inserted card is then used by the system to index into the interface description data 136 that has been stored in the memory 132. This inserted member card 102 can then be used as a normal user interface. The combination of the smartcard reader 114, the processing device 128, and the associated system memory 132 are referred to as a user interface system in the present description. If a member card of a different group is inserted, the interface system will detect a different GIN to that presently in memory, and a non-zero MIN. The system thereby recognises that this an inappropriate card, and issues a warning such as an audible beep. The user, in this case, either inserts an appropriate base card, or a member card associated with the last inserted base card.

It is seen that member cards of a card group need only store two items of information, namely the group GIN and a personal MIN. These data can be stored in a relatively small amount of memory, typically 32 bits for the GIN, and 16 bits for the MIN, which is a total of only 48 bits. These member cards are, accordingly, significantly cheaper than a standard 4K bit card, which is now required only to support requirements of the single base card. As explained in the description however, a base card must be inserted before any associated member cards of a group can be used.

The method of providing a plurality of programmable user interfaces is preferably practiced using a conventional general-purpose computer system 200, such as that shown in Fig. 2 wherein the processes described may be implemented as software, such as an application program executing within the computer system 200. In particular, the steps of the method of providing a plurality of programmable user interfaces are effected by instructions in the software that are carried out by the computer. The software may be divided into two separate parts, one part for carrying out the method of providing a plurality of programmable user interfaces, and another part to manage the user interface between the former and the user. The software may be stored in a computer readable medium, including the storage devices described below, for example. The software is loaded into the computer from the computer readable medium, and then executed by the computer. A computer readable medium having such software or computer program recorded on it is a computer program product. The use of the computer program product in the computer preferably effects an advantageous apparatus for providing a plurality of programmable user interfaces in accordance with the embodiment of the invention.

The computer system 200 comprises a computer module 201, input devices such as a keyboard 202 and mouse 203, output devices including a printer 215 and a display device 214. A Modulator-Demodulator (Modem) transceiver device 216 is used by the computer module 201 for communicating to and from a communications network 220, for example connectable via a telephone line 221 or other functional medium. The modem 216 can be used to obtain access to the Internet, and other network systems, such as a Local Area Network (LAN) or a Wide Area Network (WAN).

The computer module 201 typically includes at least one processor unit 205, a memory unit 206, for example formed from semiconductor random access memory (RAM) and read only memory (ROM), input/output (I/O) interfaces including a video

interface 207, and an I/O interface 213 for the keyboard 202 and mouse 203 and optionally a joystick (not illustrated), and an interface 208 for the modem 216. A storage device 209 is provided and typically includes a hard disk drive 210 and a floppy disk drive 211. A magnetic tape drive (not illustrated) may also be used. A CD-ROM drive 212 is typically provided as a non-volatile source of data. The components 205 to 213 of the computer module 201, typically communicate via an interconnected bus 204 and in a manner which results in a conventional mode of operation of the computer system 200 known to those in the relevant art. Examples of computers on which the embodiments can be practised include IBM-PC's and compatibles, Sun Sparcstations or alike computer systems evolved therefrom.

Typically, the application program of the preferred embodiment is resident on the hard disk drive 210 and read and controlled in its execution by the processor 205. Intermediate storage of the program and any data fetched from the network 220 may be accomplished using the semiconductor memory 206, possibly in concert with the hard disk drive 210. In some instances, the application program may be supplied to the user encoded on a CD-ROM or floppy disk and read via the corresponding drive 212 or 211, or alternatively may be read by the user from the network 220 via the modem device 216. Still further, the software can also be loaded into the computer system 200 from other computer readable medium including magnetic tape, a ROM or integrated circuit, a magneto-optical disk, a radio or infra-red transmission channel between the computer module 201 and another device, a computer readable card such as a PCMCIA card, and the Internet and Intranets including email transmissions and information recorded on websites and the like. The foregoing is merely exemplary of relevant computer readable mediums. Other computer readable mediums may be practiced without departing from the scope and spirit of the invention.

The method of providing a plurality of programmable user interfaces may alternatively be implemented in dedicated hardware such as one or more integrated circuits performing the functions or sub functions of providing a plurality of programmable user interfaces. Such dedicated hardware may include graphic processors,  
5 digital signal processors, or one or more microprocessors and associated memories.

### **Industrial Applicability**

It is apparent from the above that the embodiment of the invention is applicable to a very wide range of applications where portable programmable user interfaces are, or  
10 can be, used. Such applications include, for example, point of sale applications, and use in kiosk based information retrieval systems.

The foregoing describes only one embodiment of the present invention, and modifications and/or changes can be made thereto without departing from the scope and spirit of the invention, the embodiment being illustrative and not restrictive.

15 Thus, for example, a further embodiment, not directly involving provision of programmable user interfaces, comprises groups of electronically readable cards for accessing Automatic Teller Machines (ATMs), each such group usable by a family. This could be of particular interest to a family with young children who would appreciate and learn from the experience of having an operative ATM card while leaving an associated  
20 access code in the hands of their parents. In this embodiment, the parent inserts a base ATM card which identifies, to the ATM, the name of the relevant account. Thereafter, the parent enters the required Personal Identity Number (PIN) to provide access to the account. Subsequently, after the parent withdraws the base card from the ATM, each child having an associated member ATM card can insert their member card into the  
25 ATM, and withdraw funds. The ATM reads the relevant account name from the ATM

card for each child, but does not need the PIN, which has already been entered by the parent using the base card. After the children have made their withdrawals for the day, the parent cancels the access by pressing an appropriate key on the ATM, and now the children's cards are no longer operative.

~~Claims~~ The Claims defining the invention are as follows:

1. A method of providing programmable user interfaces, in a system comprising a plurality of programmable smartcards, aggregated into a lesser plurality of groups of said smartcards, said method comprising the steps of:
  - (a) inserting a first smartcard into a smartcard reader;
  - (b) reading and storing, by the smartcard reader, if said first smartcard is a base smartcard, (i) an identity for a group, (ii) an identity of the base smartcard, (iii) an interface description for the base smartcard, (iv) an identity for at least one associated member card, and (v) an interface description for said at least one associated member card;
  - (c) ejecting the first smartcard from the smartcard reader and inserting a second smartcard therein, said smartcard reader making accessible a user selectable icon, having an associated action, on a surface of the inserted second smartcard;
  - (d) reading by the smartcard reader, if said second inserted smartcard is a member card associated with said base smartcard, of (i) said identity of said group, to which said second inserted smartcard is associated, and (ii) an identity of the inserted associated member smartcard;
  - (e) comparing the group identity read from the first smartcard to the group identity read from the second smartcard; and
  - (f) enabling, because said compared group identities match, the associated action if a user selects the user selectable icon, whereby the association between the icon and the action is defined by the interface description for the associated member smartcard read and stored from the associated base smartcard.

25



2. A method according to claim 1, whereby if in step (c) said second inserted smartcard is a member card associated with another base smartcard, the method comprises, after step (c), the steps of:

(g) reading by the smartcard reader of (i) an identity of a group to which said  
5 second inserted smartcard is associated, and (ii) an identity of the inserted member smartcard;

(h) comparing the group identity read from the first smartcard to the group identity read from the second smartcard; and

(i) not enabling, because said compared group identities do not match, the  
10 associated action if a user selects the user selectable icon.

3. A method according to claim 1, whereby if in step (c) said second inserted smartcard is said other base smartcard, the method reverts to step (b), regarding said second inserted smartcard as being said first inserted smartcard as previously defined in  
15 step (a).

4. A method according to claim 2, whereby the method comprises the further step of:

(j) emitting an alarm to the user, indicating that insertion of an incompatible  
20 member card has occurred.

5. A method for enabling smartcard initiated actions associated with a group of smartcards comprising a base smartcard and at least one associated member smartcard, said method comprising steps of:

25 inserting the base smartcard into a smartcard reader;

reading by said smartcard reader of base smartcard data and first data for the associated member smartcard;

inserting the member smartcard into the smartcard reader;

reading by said smartcard reader of second data from the inserted member  
5 smartcard; and

enabling a smartcard initiated action associated with the member smartcard dependent upon a correspondence between the first data and the second data.

10

**Dated 20 April, 2000**  
**Canon Kabushiki Kaisha**  
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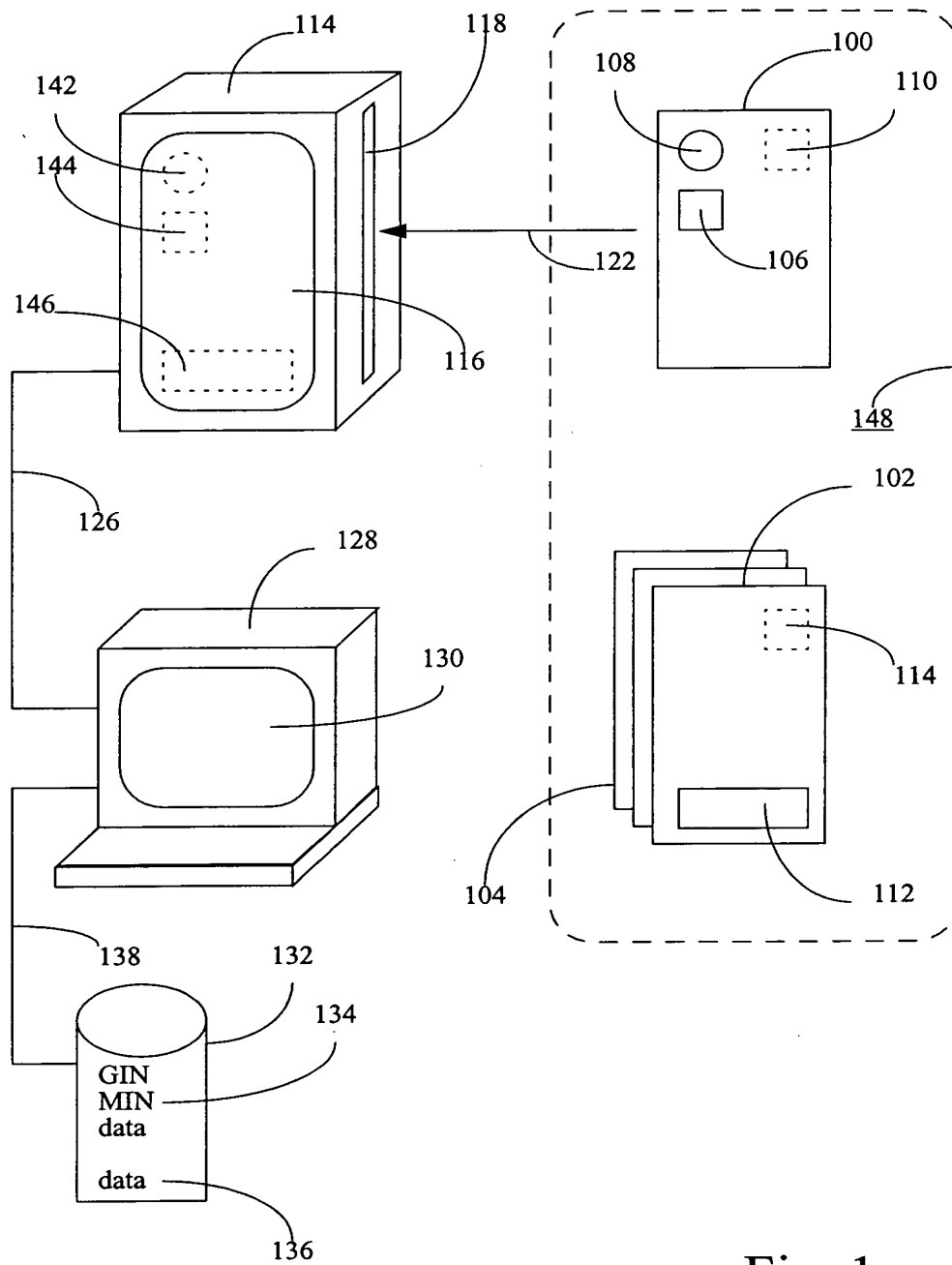


Fig. 1

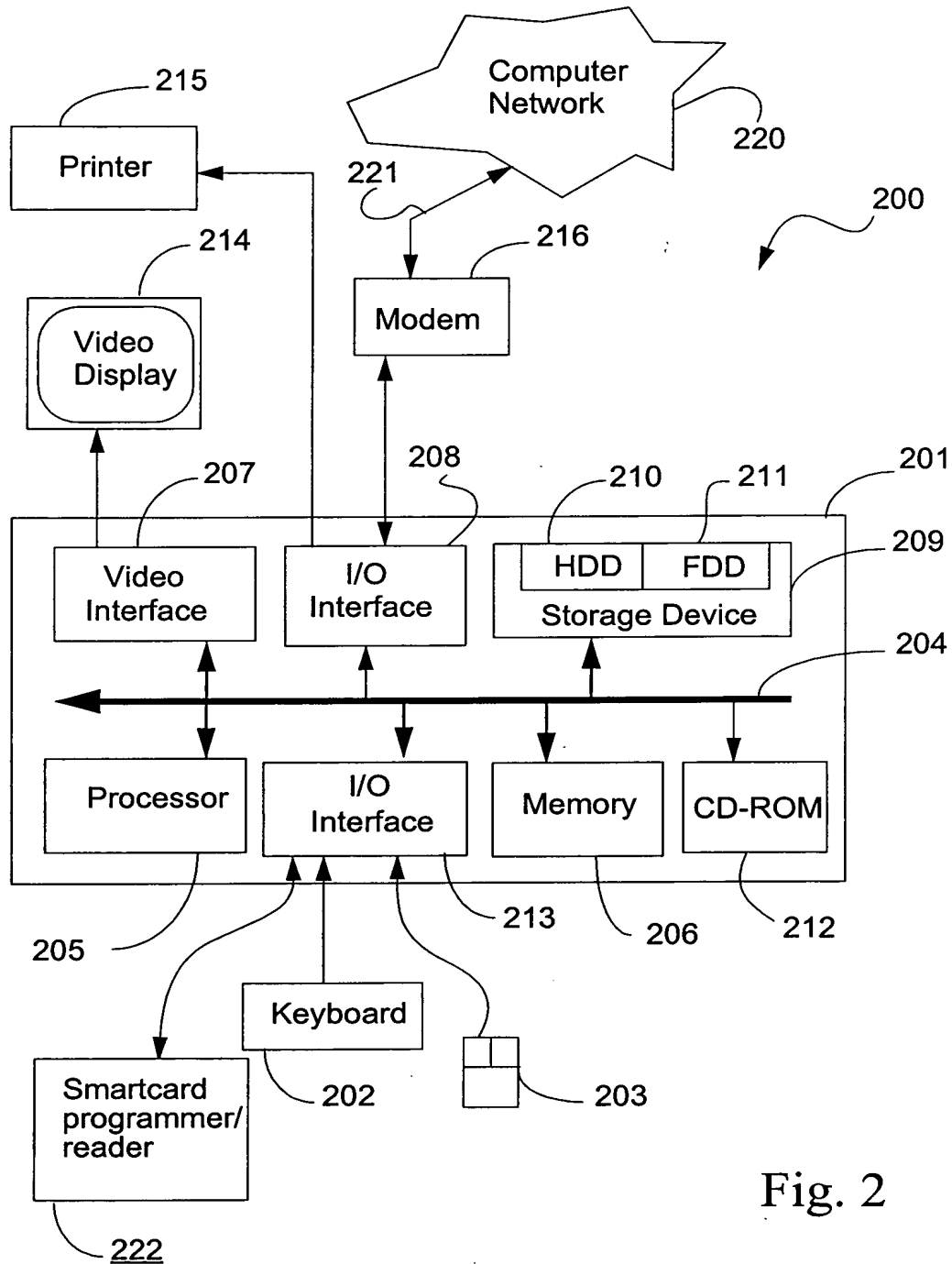


Fig. 2